

**Unit**  
**08**

## **NUTRITION**

### **Q.1. Define Nutrition and Nutrients?**

#### **Ans. Nutrition**

The process in which food is obtained or prepared, absorbed and converted into body substances for growth and energy is called nutrition.

#### **Nutrients**

These are the elements and compounds that an organism obtains and uses for energy source or for the synthesis of new materials. e.g., carbohydrates, proteins, lipids or fats etc.

### **Q.2. Describe types of organisms on the basis of nutrition?**

#### **Ans. Types of organisms**

There are two types of organisms on the basis of nutrition.

##### **i) Autotrophic organisms**

The organisms which prepare their own food from inorganic elements are called autotrophic organisms. e.g. some bacteria, all algae and all plants.

They obtain water, carbon dioxide and minerals from their environment and prepare their food. This food is then used for growth and energy as well.

##### **ii) Heterotrophic organisms**

The organisms which obtain their food from other organisms are called heterotrophic organisms e.g., Most bacteria and all protozoans fungi and animals. They use food for growth and energy.

### **Q.3. How plants get their food? Explain briefly?**

**Ans.** Plants are autotrophic and prepare their food through photosynthesis. Plants get carbon, hydrogen and oxygen from carbon dioxide and water. Plants also require mineral elements for various activities and structures.

### **Q.4. Define macronutrients and micronutrients. Explain mineral requirements of plants in detail?** (Lahore board 2011 G I & 2012 G II)

#### **Ans. Macronutrients**

“The nutrients which are required by plant in larger quantities are called macronutrients.” e.g., carbon, hydrogen, oxygen etc. These are nine in number.

#### **Micronutrients**

“The nutrients which are required by plant in small quantities are called micronutrients.” e.g iron, boron etc. These are eight in number.

**Table 8.1: Role of Mineral Elements in Plant Life**

	Mineral elements	Role of Macronutrients in plant life
<b>Macronutrients</b>	Phosphorus (Lahore board 2011 G II)	Component of ATP, nucleic acids, and coenzymes, necessary for seed germination, photosynthesis, protein formation etc.
	Potassium	Regulates the opening and closing of the stoma, reduces water loss from the leaves
	Sulphur	Component of proteins, vitamins and enzymes
	Calcium	Activates enzymes, is a structural component of cell wall, influences water movement in cells
<b>Micronutrients</b>	Iron	Necessary for photosynthesis, activates many enzymes
	Molybdenum	Component of the enzyme that reduces nitrates to ammonia, important in building amino acids
	Boron	Important in sugar transport, cell division, and synthesizing certain enzymes
	Copper	Component of several enzymes
	Manganese	Involved in enzyme activity for photosynthesis, respiration, and nitrogen metabolism
	Zinc	Required in a large number of enzymes
	Chlorine	Involved in osmosis of water
	Nickel	Required in a nitrogen metabolism

- Carbon and oxygen are absorbed from air, while other elements are absorbed from the soil.

**Q.5. What is the role of nitrogen and magnesium on plant growth?**

(Lahore board 2011 G I) (short question)

**Ans. Role of Nitrogen**

- Plants get nitrogen in the form of nitrates.
- Nitrogen is a major component of proteins, hormones, chlorophyll, vitamins and enzymes essential for plant life.
- Nitrogen metabolism is major factor in stem and leaf growth.

**Effects of deficiency of Nitrogen**

- Deficiency of nitrogen can reduce yields.
- It also causes yellowing of leaves.
- Deficiency of nitrogen causes stunt growth.

**Effects of excess of Nitrogen:**

Too much nitrogen can delay flowering and fruiting.

### Role of Magnesium

- Magnesium is a structural component of chlorophyll.
- It is necessary for functioning of plant enzyme to produce carbohydrates, sugars and fats.
- It is used for fruit and nut formation.
- It is essential for germination of seeds.

### Effects of deficiency of Magnesium

- Deficiency of magnesium causes yellowing and wilting of leaves.

### Q.6. How are Inorganic and Organic fertilizers important in agriculture?

#### Ans. Fertilizers

“The addition of certain materials to soil sometimes results in plant growth with desirable characteristics (e.g. more fruit, faster growth, more attractive flowers). Such materials are named as fertilizers.”

#### Classification of fertilizers

Fertilizers are broadly classified as;

- (i) Inorganic fertilizers
- (ii) Organic fertilizers

#### Inorganic Fertilizers

“Naturally occurring materials which are not chemically modified are called inorganic fertilizers.”

#### Example

Naturally occurring inorganic fertilizers include;

- (i) Rock phosphate
- (ii) Elemental sulphur
- (iii) Gypsum

#### Nitrogen Fertilizers:

If nitrogen is the main element of fertilizers, they are called nitrogen fertilizers.

#### Importance of Inorganic Fertilizers

- Mostly inorganic fertilizers dissolve readily in water and are immediately available to plant for uptake.
- These fertilizers efficiently supply the required nutrients for plant growth.

#### Organic Fertilizers

“Materials which are more complex chemical substances that take time to be broken down into forms usable by plants are called organic fertilizers.”

**Example:** Manure and compost

#### Origin

Organic fertilizers are derived from either plant or animal materials containing one or more essential elements.



**Importance of Organic Fertilizers** (Lahore board 2012 G I)

- Organic fertilizers have less salts so their larger amount can be applied without injury to plant roots.
- They can also increase soil drainage, aeration, water holding capacity.
- They can increase ability of soil to hold nutrients.

**Q.7. Discuss the hazards of environment related to fertilizers' use?**

**Ans.** The massive quantities of inorganic fertilizers cause different environmental hazards which are as follows:

**(i) Soil nutrient holding capacity:**

The massive quantities of inorganic fertilizers affect the soil nutrient holding capacity.

**(ii) Eutrophication:**

The high solubility of fertilizers also degrade ecosystem through eutrophication (means an increase in chemical nutrients typically compounds containing nitrogen or phosphorus in an ecosystem).

**(iii) Emission of greenhouse gas:**

Storage and application of some nitrogen fertilizers may cause emission of greenhouse gas, nitrous oxide

**(iv) Soil acidity:**

Ammonia gas ( $\text{NH}_3$ ) may be emitted from applied inorganic fertilizers. This extra ammonia can also increase soil acidity.

**(v) Pest Problems:**

Excessive nitrogen fertilizers can lead to pest problem by increasing their reproduction rate.

**(vi) Nutrient Balance:**

It is recommended that nutrient content of the soil and nutrient requirement of crop are carefully balanced with application of inorganic fertilizers.

Hazards occur due to excessive use of organic fertilizers. Excessive amount of organic fertilizers cause environmental problems due to nitrate leaching or run off of soluble organic compounds.

**Q.8. Describe the sources, energy values and functions of carbohydrates, proteins and fats in detail?**

**Ans. Carbohydrates**

Carbohydrates are the basic source of energy for all animals.

**(i) Sources**

Plants synthesize carbohydrates during photosynthesis. Animals get carbohydrates from their environment.

Humans get carbohydrates from food like bread, pastas, beans, potatoes, bran, rice and cereals.

**(ii) Energy value**

About half to 2/3 of total calories, every animal consumes daily are from carbohydrates. Carbohydrates contain 04 kilocalories per gram.

**(iii) Functions**

Carbohydrates is common source of energy. e.g. glucose.

**(iv) Other useful carbohydrates**

Other useful carbohydrates are maltose, lactose, sucrose and starch.

**Proteins**

**(i) Introduction**

“Proteins are composed of amino acids.”

**(i) Sources**

Meat, eggs, grains, legumes and dairy products such as milk and cheese are dietary sources of proteins.

**Energy level**

One gram of proteins contains 04 kilocalories of energy.

**Functions**

(i) Proteins can also be used for gaining energy.

(ii) Proteins are essential components of muscles, ligaments and tendons.

(iii) They are also major components of cytoplasm, membranes and organelles.

(iv) Proteins play role as “enzymes”.

(v) Proteins are used for growth

**Lipids (Lahore board 2012 G II) (short questions)**

“Lipids present in food are composed of fatty acids bonded to glycerol.”

**Types of fatty acids:**

Fatty acids of lipids are;

(i) Saturated fatty acids.

(ii) Un-saturated fatty acids.

**(i) Saturated fatty acids**

Saturated fatty acids have all of their carbon atoms bonded to hydrogen atoms.

**(ii) Unsaturated fatty acids**

Un-saturated fatty acids have some of their carbon atoms double-bonded in place of hydrogen atoms.

Lipids containing Saturated fatty acids are solid at room temperature.

Lipids containing un-saturated fatty acids are liquid at room temperature.

**Example:**

- (i) Butter contains 70% saturated and 30% unsaturated fatty acids.
- (ii) Sunflower oil contains 75% unsaturated and 25% saturated fatty acids.

**(iii) Sources**

Milk, butter, cheese, eggs, mutton, fish, mustard seeds, coconut and dry fruit etc.

**(iv) Energy Level**

One gram of lipids contains 09 kilocalories of energy.

**(v) Functions**

- (i) Lipids are also useful energy source.
- (ii) It is used to form membranes, sheaths of neurons and hormones.

**Q.9. What are minerals? Discuss their roles in human body.**

**Ans. Minerals in food**

**Definition:** “Minerals are inorganic elements that originate in Earth and cannot be made in the body.”

**Role:** They play important roles in various body functions and are necessary to maintain health.

**Sources:** Most minerals in human diet come directly from plants and water or indirectly from animal foods.

**Types:**

- (i) **Major minerals:** are required in amount of 100mg or more per day.
- (ii) **Trace minerals:** are required in amount less than 100 mg per day.

Table 8.2: Important minerals in human diet and their roles		
Minerals	Role in body	
Major minerals		
Sodium	Fluid balance in the body Helps in absorption of other nutrients	Important for muscle contraction, nerve impulse transmission, heart function, and blood pressure
Potassium	Fluid balance in the body Acts as cofactor for enzymes	
Chloride	Fluid balance in the body Component of hydrochloric acid	
Calcium	Development and maintenance of bones and teeth Blood clotting	
Magnesium & Phosphorus	Development and maintenance of bones and teeth	
Trace minerals		
Iron	Oxygen transport and storage	Act as enzyme cofactors Support immune function
Zinc	Aids insulin action Helps in growth and reproduction	
Copper	Acts as enzyme cofactor	
Chromium	Helps in insulin action	
Fluoride	Stabilizes bone mineral and hardens tooth enamel	
Iodine	Essential for normal thyroid function	



**Q.10. Describe the role of calcium and iron in our diet.**

**Ans. Calcium**

- (i) **Role of calcium** (Lahore board 2012 G II) (Lahore board 2012 G I)  
 (i) Calcium is essential for the development and maintenance of bones and teeth.  
 (ii) It is also needed for maintaining cell membranes and connective tissues.  
 (iii) It is used for activation of several enzymes.  
 (iv) Calcium also aids in blood clotting.  
 (v) Good calcium nutrition, along with low salt and high potassium intake, prevents from hypertension and kidney stones.

**(ii) Sources:-**

Humans get calcium from milk, cheese, egg Yolk, beans, nuts, cabbage etc.

**Effects of Calcium Deficiency**

- (i) Spontaneous discharge of nerves impulses which may result in tetany.  
 (ii) Bones also become soft, blood clots slowly and wounds heal slowly.

**Iron:**

- (i) **Role of Iron** (Lahore board 2012 G II)  
 (i) Iron plays a major role in oxygen transport and storage.  
 (ii) It is a component of haemoglobin in red blood cells and myoglobin in muscle cells.  
 (iii) Cellular energy production also requires iron. It acts as cofactor for many enzymes of cellular respiration.  
 (iv) Iron also supports immune function.

**(ii) Sources:**

Humans get iron from red meat, egg yolk, whole wheat, fish, spinach, mustard etc.

**(iii) Effects of Iron deficiency**

Iron deficiency causes anaemia.

**Q.11. Define vitamins. Describe different types of Vitamins.**

**Ans. Definition**

Vitamins are chemical compounds that are required in low amounts but are essential for normal growth and metabolism.

**Types**

Vitamins may be divided into two groups:

- (i) **Fat-soluble Vitamins** (Lahore board 2012 G II) (short questions)

These are Vitamins A, D, E and K.

Fat-soluble vitamins are much less excreted from the body as compared to water-soluble vitamins. This means that levels of water-soluble vitamins in the body can decrease more quickly, leading to vitamin deficiency.

- (ii) **Water soluble Vitamins**

These are vitamins B and C.

Cooking or heating destroys the water soluble vitamins more readily than the fat-soluble vitamins.

### **Types**

#### **(i) Vitamin A**

##### **(i) Identification**

Vitamin A was the first fat soluble vitamin identified in 1913.

##### **(ii) Functions**

###### **(i) Formation of Rhodopsin**

Vitamin A combines with a protein called opsin to form rhodopsin in the rod cells of the retina of eye. Sometimes, there is lack of vitamin, so there is less rhodopsin. It makes difficult to see in dim light.

###### **(ii) Cell Differentiation**

It is involved in normal cell differentiation. The process through which embryonic cells transform into mature cells with highly specific functions is called differentiation.

###### **(iii) Bone Growth**

Vitamin A supports bone growth.

###### **(iv) Immune Function**

It is essential for immune function. Deficiency of Vitamin A causes decreased resistance to infections.

###### **(v) Sources**

Humans get Vitamin A from leafy vegetables (Spinach, carrots), yellow/orange fruits (mango), liver, fish, egg, milk, butter, etc.

### **Effects of Vitamin A Deficiency**

#### **(i) Blindness**

Deficiency of Vitamin A causes blindness in children worldwide. One of the symptoms of Vitamin-A deficiency is night blindness. It is a temporary condition. But if left untreated it can cause permanent blindness.

#### **(ii) Rough Hair and Skin**

Hair follicles are plugged with keratin due to deficiency of Vitamin A. It makes the hair bumpy and rough. It gives dry texture to skin.

### **(ii) Vitamin C (Ascorbic Acid)**

##### **(i) Identification**

It is a water soluble Vitamin.

##### **(ii) Functions**

###### **(i) Participation in Reactions**

Vitamin C participates in many reactions.



### (ii) Formation of a Fibrous Protein Collagen

Vitamin C is needed to form collagen (a fibrous protein). Collagen gives strength to connective tissues. Collagen is also needed for the healing of wounds.

### (iii) White blood Cells

White blood cells need Vitamin C. It enables the immune system to function properly.

### (iv) Sources

We get Vitamin C from citrus fruits e.g, oranges, Lemons, and grape fruit), Leafy green Vegetables, beef liver etc.

### Effects of Vitamin C Deficiency

#### (i) Scurvy (Lahore board 2011 G II)

Its deficiency causes connective tissue changes throughout the body. This disease known as scurvy. In this condition, synthesized collagen is too unstable.

Symptoms of scurvy are muscle and joint pain, swollen and bleeding gums, slow wounds healing and dry skin.

### Vitamin D

#### (i) Identification

It is fat soluble Vitamin.

#### (ii) Functions

##### (i) Absorption of Minerals from Intestine

It helps to regulate levels of Calcium and Phosphorous in blood. It increases absorption of these minerals from the intestine. It also increases their deposition in bones.

##### (ii) Sources (Lahore board 2012 G I)

Vitamin D is mainly found in fish liver oil, milk, ghee and butter etc. It is also synthesized by the skin when ultraviolet (UV) radiations from the sun is used to convert a compound into vitamin D.

### Effects of Vitamin D Deficiency

(i) **Rickets:** Deficiency of vitamin D affects bones. In children, vitamin D deficiency leads to rickets, a condition in which bones weaken and bow under pressure.

(ii) **Osteomalacia:** In adults, vitamin D deficiency causes osteomalacia or "Soft bones", increasing the risk for fractures in bones.

**Table 8.3: Functions, deficiencies and sources of important vitamins**

Vitamin	Sources	Functions	Deficiency symptoms
<b>Vitamin A</b>	Leafy vegetables (spinach, carrots) Yellow fruits Fish Liver Egg, milk and butter	Vision in dim light Cell differentiation Growth Immunity	Poor growth Blindness Dry skin

<b>Vitamin C</b>	Citrus fruits Leafy green vegetables Beef liver	Collagen formation Healing of wounds Functioning of immune system	Scurvy: Fatigue, poor wound healing, Bleeding gums & joints
<b>Vitamin D</b>	Fish liver oil Milk Ghee and butter Synthesized by skin	Maintenance of the concentrations of calcium and phosphorous	Rickets in children Osteomalacia in adults

**Q.12. Why are water and dietary fibres considered important in our diets?**

**Ans. Effects of water and dietary fibres**

Strictly speaking water and dietary fibres are not considered as nutrients, but they do play important role in life.

**Introduction**

**Water**

Approximately 60% of the adult human body is composed of water. It is considered important due to following facts.

**(i) Aqueous environment:**

Nearly all of the life sustaining chemical reactions require an aqueous (watery) environment.

**(ii) Absorption & Elimination of substances**

Water functions as the environment in which water soluble food stuff is absorbed in the intestines and waste products are eliminated in urine.

**(iii) Maintenance of body temperature**

Water maintains the body temperature through evaporation as in sweating.

**(iv) Cardiovascular problems**

Severe dehydration causes cardio-vascular problems.

**(v) Requirement**

An Adult requires two litres of water on average per day from different sources i.e. natural water, milk, juicy fruits and vegetables.

**Dietary fibres** (Lahore board 2012 G II)

**Definition**

Dietary fibre (also known as roughage) is the part of the human food that is indigestible.

**Source**

It is found only in plant foods and it moves undigested through the stomach and small intestine and into the colon.

**Types of dietary fibres**

There are two types of dietary fibres.

**(i) Insoluble fibre**

(ii) Soluble fibre

(i) **Insoluble fibres**

These travel through the small intestine quickly.

**Sources**

Wheat bran, cereals and skin of many fruits and vegetables consist of insoluble fibres.

(ii) **Soluble fibres**

These fibres break down as these pass through the digestive track.

**Sources**

Oat, beans, barley and many fruits and vegetables:

**Important functions of fibres**

(i) **Prevents from constipation**

Fibre prevents and relieves constipation by stimulating the contraction of intestinal muscles,

(ii) **Lowering blood cholesterol**

Soluble fibre helps in lowering the blood cholesterol.

(iii) **Lowering blood sugar level**

Soluble fibre helps in lowering blood sugar levels.

(iv) **Exposure to carcinogens**

Insoluble fibre speeds up the movement of carcinogens (cancer causing agents) from intestine.

(v) **Use of fibre supplements**

Fibre supplements (such as ispaghol husk) should be used only with a physician's recommendations. Taken properly, these supplements may help in preventing constipation and in lowering cholesterol levels

**Q.13. What is balanced diet? How would you relate it with age, sex and activity?**

**Ans. Balanced Diet**

Humans require various types of nutrients in appropriate amount in their diet.

**Diet** is the food on which an individual lives.

**Definition**

"The diet, which contains all the essential nutrients like carbohydrates, fats, proteins, minerals, vitamins in the correct proportion for the normal growth and development of the body is called a balanced diet."

The following chart shows some of common food and %age of carbohydrates, lipids and proteins in each of them.

Food	Carbohydrates	Lipids	Proteins
Bread	52%	03%	09%
Rice	23%	0.1%	2.2%
Potato	19%	0.1%	02%



Apple	12.8%	0.5%	0.3%
Eggs	0.7%	12%	13%
Milk	04%	04%	03%
Butter	0.4%	81%	0.6%
Chicken	0	11%	20%

### Relation of balanced diet with age, gender and activity

**Relation with age:** During growth period of the body, there is higher metabolic rate in body cells and body needs a balanced diet that contains more energy.

#### Daily requirements of Proteins

**Adults:** need less proteins per kg body weight but a growing boy or girl needs more proteins per kg weight.

**Children:** need more calcium and iron for their growing bones and red blood cells.

**Relation of balanced diet with Gender:** Gender has an impact on the requirements of a balanced diet.

**Women:** have comparatively less metabolic rate than the men of same age and weight.

**Men** need a balanced diet that provides comparatively more energy than the women require.

#### Relation of balance diet with activity:

Different people have different lifestyle and varied nature of work. A man with sedentary habits does not require as much energy as the man who is on his feet for most of the day.

#### Q.14. Define malnutrition. Describe its importance and forms?

**Ans. Definition**

Problems related to nutrition are grouped as malnutrition. The condition caused by an improper or insufficient diet is called malnutrition.

#### Types

It has two types:

**Table 8.4: Estimated energy requirements (in Kilocalories) according to age, gender and activity**

Gender	Age (years)	Activity Level		
		Sedentary	Moderately active	Active
Child Male/Female	2-3	1,000	1,000-1,400	1,000-1,400
Female	4-8	1,200	1,400-1,600	1,400-1,800
	9-13	1,600	1,600-2,000	1,800-2,200
	14-18	1,800	2,000	2,400
	19-30	2,000	2,000-2,200	2,400
	31-50	1,800	2,000	2,200
	50+	1,600	1,800	2,000-2,200
Male	4-8	1,400	1,400-1,600	1,600-2,000
	9-13	1,800	1,800-2,200	2,000-2,600
	14-18	2,200	2,400-2,800	2,800-3,200
	19-30	2,400	2,600-2,800	3,000
	31-50	2,200	2,400-2,600	2,800-3,000
	50+	2,000	2,200-2,400	2,400-2,800

### (i) **Undernutrition**

Malnutrition most often refers to undernutrition. It is caused due to inadequate consumption, poor absorption or excessive loss of nutrients.

### (ii) **Overnutrition**

Malnutrition also includes overnutrition resulting from overeating or excessive intake of specific nutrients.

#### **Harms**

- (i) Malnutrition weakens the immune system.
- (ii) It impairs physical and mental health.
- (iii) It slows down thinking and stunts growth.
- (iv) It affects foetal (embryo) development.
- (v) Often it leads to infectious diseases.
- (vi) According to UNICEF, malnutrition contributes to the deaths of more than 6 million children (under age five) each year.

#### **Major Forms of Malnutrition**

##### (i) **Protein-Energy Malnutrition (PEM):**

Protein energy malnutrition refers to inadequate availability or absorption of energy and proteins in the body."

It is the leading cause of death in children in developing countries.

PEM may lead to diseases such as;

- (i) Kwashiorkor.
- (ii) Marasmus

##### (i) **KWASHIORKOR**

###### **Introduction**

In kwashiorkor, children may grow to normal height but are abnormally thin.

**Cause:** It is due to protein deficiency.

**Age:** Kwashiorkor can develop at any time during a child's growing but more common at age of about 12 months when breastfeeding is discontinued.

##### (ii) **MARASMUS**

###### **Introduction**

Marasmus patients usually lose all their body fat and muscle strength and acquire a skeletal appearance. Children with marasmus show poor growth and look small for their age.

**Cause:** It is due to protein deficiency.

**Age:** Marasmus usually develops between age of six months and one year in children.



Figure 8.1: Children suffering from (a) Kwashiorkor (b) Marasmus



**(ii) Mineral Deficiency disease (MDD)**

Diseases resulting from deficiency of a mineral are relatively rare among humans. Some are given below;

**(i) Goiter**

Goiter is a condition in which thyroid gland becomes enlarged and it results in swelling in neck.

**Cause:** Goiter is caused by an insufficient amount of “Iodine” in diet.

Iodine is used by thyroid gland to produce hormones that control the body’s normal functioning and growth.

**(ii) ANEMIA** (most common of all mineral deficiency diseases)

“The term anemia literally means “a lack of blood”.

**Causes:** The condition is caused when number of red blood cells reduced to a level lower than normal.

**Explanation**

Haemoglobin molecule contains a single atom of iron at its centre. If body fails to receive sufficient amount of iron, an adequate number of haemoglobin will not be formed. So, there are not enough functioning red blood cells. A person becomes weak and there is shortage of oxygen supply to body’s cells.

**(ii) Over intake of Nutrients (OIN)**

Over intake of nutrients (OIN) is a form of malnutrition in which more nutrients are taken than the amount required for normal growth, development and metabolism.”

The effects of over-intake of nutrients are usually intensified when there is reduction in daily physical activity (decline in energy expenditure)

**High intake of carbohydrates and fats leads to;**

**(i)** Obesity

**(ii)** Diabetes

**(iii)** Cardiovascular problems

**High dose of vitamin A causes;**

**(i)** Loss of appetite.

**(ii)** Liver problems.

**Excess dose of vitamin D causes;**

Deposition of calcium in various tissues.

**Q.15. Describe effects of Malnutrition.**

**Ans. Effects of Malnutrition**

**(i) Starvation:** Starvation is a severe reduction in nutrient and energy intake. In humans, prolonged starvation causes permanent organ damage. It may result in death.



### (ii) Heart Diseases

It is one of the causes of malnutrition. Heart problems occur in those people who take unbalanced diet. Fatty foods increase blood cholesterol level. It obstructs the blood vessels leading to heart diseases.

### (iii) Constipation

People do not schedule their meals. This irregularity cause many health problems like constipation.

### (iv) Obesity

“Obesity means becoming over-weight and it may also be due to malnutrition.”

People who take food that contains energy more than their requirement and do very little physical work can become obese.

Obesity is known as mother-disease and may lead to heart problems, hypertension, diabetes etc.

(v) The World Health Organization (WHO) estimates that, within the next few years, diseases due to malnutrition will become the principal global causes of mortality.

(vi) According to the Food and Agriculture Organization of the United Nations, more than 25,000 people die of starvation every day. On average, every five seconds a child dies from starvation.

### Q.16. Describe famine as the major cause of malnutrition.

#### Ans. Introduction

Famine is the lack of enough food to feed all the people living in an area.

Most terrible Famines of the 20<sup>th</sup> Century are the:

(i) The Ethiopian Famine (1983-1985)

(ii) The North Korean Famine (1990s)

#### Causes

##### (i) Unequal distribution of food

Due to political and administrative problems the food is not equally distributed to the different regions of the world. The result is that there is always surplus food in countries like America, UK and Canada etc and at the same time people have nothing to eat in countries like Ethiopia, Somalia etc.

##### (ii) Drought

###### (i) Definition

A drought is a period of time when there is not enough water to support agricultural and human needs.

###### (ii) Cause

It is usually due to an extended period of below normal rainfall.

**(iii) Effects**

It decreases or even stops the crop yields resulting in famine.

**(iii) Flooding**

**(i) Definition**

It occurs due to more than normal rainfall or due to weak water distribution system. Rivers and canals overflow their banks and destroy the soil quality of agricultural lands.

**(ii) Effect**

It becomes impossible to grow crops immediately after flooding.

**(iv) Increasing population**

In the over populated regions of the world, large populations overuse natural resources to grow maximum food in order to meet the problems of food shortage. It leads to dry and infertile lands and depletion of resources and famines result.

**Q.17. Describe digestion and its phases.**

**Ans. Definition**

Digestion is the process in which large and non-diffusible molecules of food are converted into smaller and diffusible molecules that can cross the membranes.

**Phases of Digestion**

The nutrition in humans comprises of the following phases.

**1. Ingestion**

The process of taking in food.

**2. Digestion**

The process of breaking up complex substances into simpler substances.

**3. Absorption**

Diffusion of digested food into blood and lymph.

**4. Assimilation**

Conversion or incorporation of absorbed simple food into the complex substances constituting the body.

**5. Defecation**

Elimination of undigested food from the body.

**Q.18. Explain various parts of digestive system and process of digestion and absorption in detail?**

**Ans. Explanation**

**Products of digestion**

Proteins are digested into amino acids, polysaccharides into simple sugars (e.g. glucose) and lipids into fatty acids and glycerol.

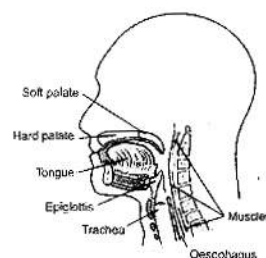


Figure 8.2: Parts of oral cavity



## Alimentary Canal

The human digestive system consists of a long tube that extends from the mouth to the anus. This tube is called alimentary canal.

### Main structures of Alimentary Canal

- (i) Oral cavity
- (ii) Pharynx
- (iii) Oesophagus
- (iv) Stomach
- (v) Small intestine
- (vi) Large intestine
- (vii) Glands associated with alimentary canal.  
(a) liver (b) pancreas (c) three pairs of salivary glands.

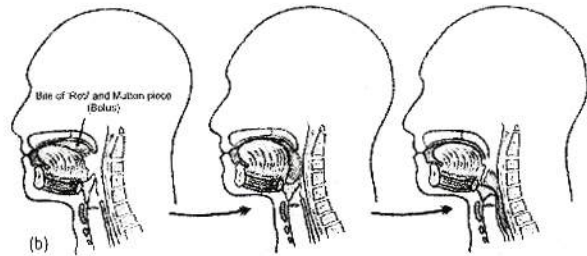


Figure 8.3: Steps in swallowing

### (i) Oral cavity

#### Definition

“Oral Cavity is the space behind mouth and has many important functions.

#### Functions of oral cavity:

(i) **Food Selection:** When food enters the oral cavity it is tasted and felt. Here food is selected or rejected due to taste, hard object or dirt. Smell and vision also help in selection.

(ii) **Grinding of food:** The second function of oral cavity is the grinding of food by teeth. It is known as chewing or mastication. It is useful because oesophagus can pass only small pieces through it because enzymes cannot act on large pieces of food.

(iii) **Lubrication of food:** The third function of the oral cavity is lubrication of food by mixing saliva secreted by three pairs of salivary glands in oral cavity. Saliva has two main functions.

(i) Adds water and mucous to the food.

(ii) Partial digestion of starch by saliva which contains an enzyme salivary amylase.

#### (iv) Chemical digestion:

Saliva contains an enzyme salivary amylase which aids in the digestion of starch partially. After chewing, lubrication and partial digestion, the pieces of bread and mutton are rolled up by the tongue into small, slippery, spherical mass called bolus.

#### (v) Swallowing of the bolus

Then food is swallowed in the form of bolus and pushed in oesophagus through the Pharynx.



## (ii) Pharynx and oesophagus:

### Peristalsis:

The bolus is swallowed and then pushed down by the movement called peristalsis.

### Definition

It is defined as the waves of contraction and relaxation in the smooth muscles of the walls of alimentary canal.

### Entry of bolus into Pharynx

During swallowing, the bolus is pushed to the back of mouth by the tongue. The soft palate moves upward and to rear in order to close the opening of the nasal cavity.

### Adaptations to Prevent the bolus in Trachea

Pharynx has adaptations to prevent the entry of bolus in trachea. During swallowing, larynx moves upward and forces the epiglottis into horizontal position. Thus respiratory track is closed. The beginning of the swallowing action is voluntary, but once food reaches the back of the mouth, swallowing becomes automatic.

### (iii) Oesophagus

After being swallowed, the food enters the tube called the oesophagus, which connects the pharynx to stomach. Neither pharynx nor the oesophagus contributes to digestion and the previous digestive actions of saliva continue.

### (iv) Digestion of food in stomach

(Lahore board 2011 G I, II & 2012 G I)

### Definition and Location

Stomach is a dilated part of the alimentary canal. It is J shaped, located in the left part of abdomen, just beneath the diaphragm.

### Structure

Stomach has two main portions, Cardiac and Pyloric portions.

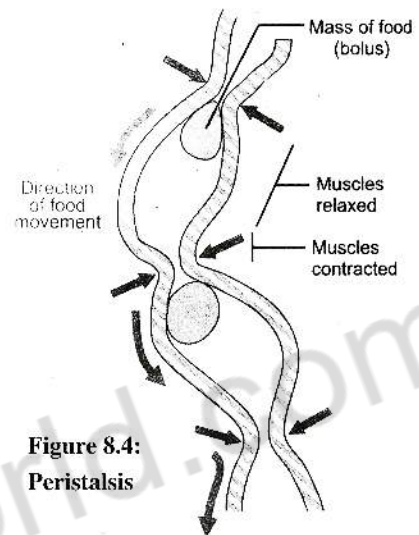
The cardiac portion is present immediately after oesophagus and the pyloric portion is located beneath the cardiac portion.

### Sphincters

Stomach has two sphincters (opening which are guarded by muscles). The cardiac sphincter is between stomach and oesophagus. Pyloric sphincter is between stomach and small intestine.

### Entry of food into stomach

The bolus enters the stomach from oesophagus through the cardiac sphincter.



**Figure 8.4:**  
**Peristalsis**

### Digestion in Stomach

(i) When food enters into the stomach the gastric juice is secreted by gastric glands found in the stomach wall. It is composed of

(i) Mucous

(ii) Hydrochloric acid

(iii) Protein digesting enzyme pepsinogen.

(ii) Hydrochloric acid converts the inactive enzyme pepsinogen into active form called pepsin. HCl also kills microorganisms present in food.

(iii) Pepsin partially digests the protein portion of the food into polypeptides and shorter peptide chains.

(iv) In stomach food is further broken apart through a process called churning. The walls of stomach contract and relax and these movements help in thorough mixing of the gastric juice and food.

(v) The churning action also produces heat which helps to melt the lipid contents of the food.

(vi) The starch and proteins in our food have been partially digested and food has been converted into a soup like mixture called chyme.

(vii) After it, the pyloric sphincter allows a little mass of chyme to enter duodenum.

### (v) Digestion in small intestine

Small intestine is divided into 3 parts

(i) Duodenum

(ii) Jejunum

(iii) Ileum

(i) **Duodenum:** comprises of first 10 inches (25 cm) of the small intestine and it is the part of alimentary canal where most of the digestive process occurs. Here food is mixed with three different secretions.

(i) Bile from liver helps in the fat digestion, through emulsification.

(ii) Pancreatic juice from pancreas contains enzymes trypsin, pancreatic amylase and lipase, which digest proteins, carbohydrates and lipids respectively.

(iii) Intestinal juice from intestine walls contains many enzymes for complete digestion of all kinds of food.

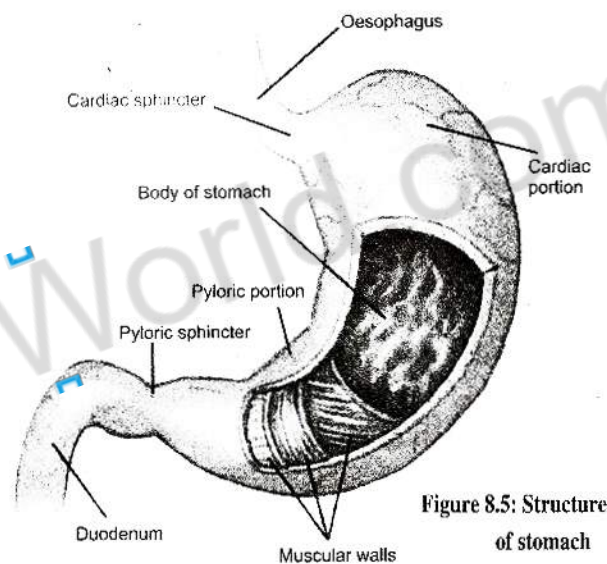


Figure 8.5: Structure of stomach



**(ii) Jejunum:** Next to the duodenum is 2.4 meters long jejunum. It is concerned with rest of the digestion of Proteins, carbohydrates and lipids of our bite.

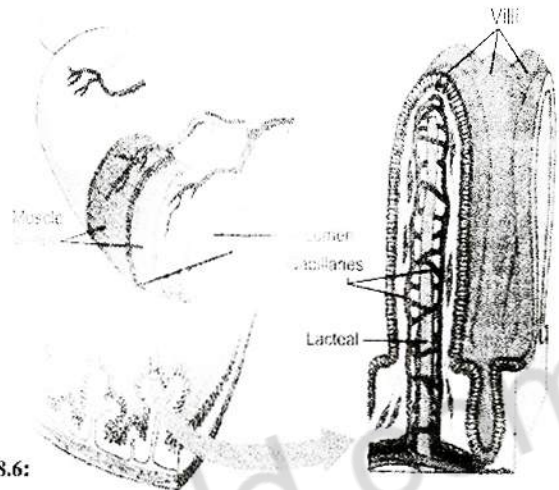
**(iii) Ileum:** Last 3.5 meters long part of the small intestine is Ileum. It is concerned with the absorption of digested food.

### Absorption of food in small intestine:

#### (i) Villi

There are circular folds in the inner wall of the ileum. These folds have numerous finger like projections called villi (singular: villus). Villi increase the surface area of the inner walls and it helps a lot in the absorption of digested food. Each villus is richly supplied with blood capillaries and a vessel of lymphatic system called lacteal. The wall of villus is only single cell thick.

Figure 8.7  
Small and Vi  
8.6:



#### (ii) Absorption of sugar and amino acids

The digested molecules i.e. simple sugars and amino acids are absorbed from the intestine into the blood capillaries present in villi. Blood carries them away from the small intestine via the hepatic portal vein and goes to the liver for filtering, removal of toxins and nutrients processing.

#### (iii) Absorption of fatty acids and glycerol

Fatty acids and glycerol are absorbed into the lymphatic vessel (lacteal) present in villi, which carries them to the main lymphatic duct, from where they enter in the blood stream.

#### (vi) Large intestine-absorption of water and defecation

After the digested products of our bite have been absorbed in blood, the remaining mass enters the large intestine.

#### Parts of large intestine:

It has 3 parts. i. Caecum      ii. Colon      iii. Rectum

**(i) A caecum** or pouch that forms the T-junction with small intestine.

**(ii) The colon:** From colon, water is absorbed into the blood.

**Faeces:** As the water is absorbed, the solid remains of food are called faeces. It contains

**(i)** undigested material

**(ii)** a large no of bacteria

**(iii)** Sloughed off cells of alimentary canal.



(iv) Bile pigments and

(v) Water as a part of the faeces.

(iii) **Rectum:** Last part of the large intestine is rectum where faeces are temporarily stored.

**Anus:** Rectum opens out through a pore called anus.

### Defecation

When rectum is filled with faeces, it gives rise to a reflex and anus is opened for defecation.

This reflex is consciously inhibited in adults but in infants it is controlled involuntarily. During growth, the child learns to bring this reflex under voluntary control.

### Q.19. Describe the structure and functions of liver?

#### Ans. Introduction

A dark reddish organ, the liver is the largest gland of the body.

#### (i) Weight and size

In an adult human, it weighs about 1.5 kg and is the size of a football.

#### (ii) Location

Liver lies beneath the diaphragm on the right side of the abdomen.

#### (iii) Structure

It consists of a larger right lobe and a smaller left lobe.

#### (iv) Gall Bladder

A pear shaped greenish yellow sac, the gall bladder lies along the right lobe of liver on the ventral side.

#### (v) Function of digestion

Liver secretes bile which is stored in the gall bladder.

#### Emulsification

Bile is released in duodenum through bile duct. Bile has bile salts which keep lipid droplets separate from one another, a process called emulsification.

#### (vi) Other Functions

Beside digestion, liver carries out a number of other functions. Some of which are summarized here:-

#### (i) Deamination

Removes amino groups from amino acids

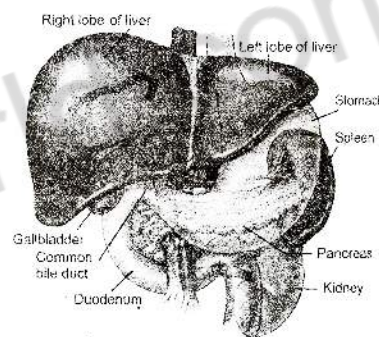


Figure 8.7: Liver and Associated organs

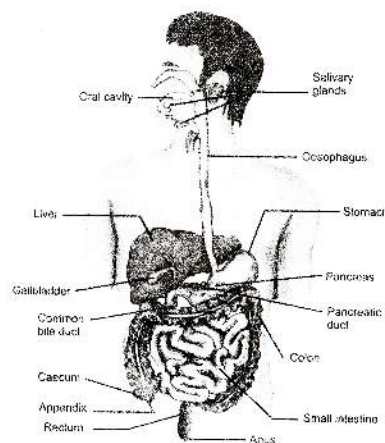


Fig: 8.8 Human Digestive System

**(ii) Formation of urea**

Converts ammonia to a less toxic form i.e., urea

**(iii) Destruction of red blood cells**

Destroys the old red blood cells.

**(vi) Formation of blood clotting proteins**

Manufactures blood clotting proteins called fibrinogen.

**(ii) Interconversion of glucose**

Converts glucose into glycogen and, when required, breaks glycogen into glucose.

**(vi) Production of cholesterol**

Converts carbohydrates and proteins into lipids and produces cholesterol.

**(vii) Production of heat**

Produces heat to maintain body temperature.

**(viii) Storage of fat soluble vitamins and minerals**

Stores fat-soluble vitamins (A,D,E, and K) and mineral ions, such as iron.

**Q.20. Briefly give the signs and symptoms, causes, treatments and preventions of Diarrhoea, constipation and ulcer?**

**Ans. Diarrhoea**

**Introduction:** It is a condition in which the sufferer has frequent watery, loose bowel movements.

**Sign and symptoms**

This condition may be accompanied by;

Abdominal pain

Nausea

Vomiting

**Causes:** It occurs when required water is not absorbed in blood from colon.

The main cause of diarrhoea include;

Lack of adequate safe water

Virus and bacteria may cause it.

**Treatment**

In malnourished individuals, diarrhoea can lead to severe dehydration and can become life threatening.

Treatment for diarrhoea involves consuming adequate amounts of water to replace loss, preferably mixed with essential salts and some amount of nutrients.

Antibiotics may be required if diarrhoea is due to bacterial infection.

**Prevention:** Take clean water and essential salts.

Eat regularly.

Take hygienic measures.



**Constipation:** Constipation is a condition where a person experiences hard faeces that are difficult to eliminate.

**Causes:** The main causes of constipation are:

- (i) Hardening of faeces due to excessive absorption of water through colon.
- (i) Insufficient intake of dietary fibre.
- (ii) Dehydration
- (iv) Use of medicine (e.g. those containing iron, calcium and aluminum)
- (v) Tumours in rectum or anus.

**Treatment:** Treatment of constipation is;

- (i) With a change in dietary and exercise habits.
- (ii) Laxative (e.g. paraffin) may be used in some cases.

**Prevention:**

- (i) Constipation is easier to prevent than treat.
- (ii) Take required quantities of water and dietary fibres.

**Ulcer**

**Definition**

Ulcer (peptic ulcer) is a sore in gut lining.

**Types**

- (i) Ulcer of stomach is called "gastric ulcer".
- (ii) Ulcer of duodenum is called "duodenal ulcer"
- (iii) Ulcer of oesophagus is called "esophageal Ulcer."

**Causes**

- (i) Breakdown of tissue by acidic gastric juice.
- (ii) Infection.
- (iii) Long term use of anti-inflammatory medicine (e.g. aspirin).
- (iv) Smoking.
- (v) Drinking coffee, colas
- (vi) Eating spicy food.

**Sign and symptoms**

- (i) Abdominal burning after meals.
- (ii) Abdominal pain.
- (iii) Rush of saliva after an episode of regurgitation.
- (iv) Nausea
- (v) Loss of appetite.
- (vi) Loss of weight.

**Treatment :** Treatment of ulcer is with medicine, containing (alkaline composition).

**Prevention :** Avoid

- i) Spicy food
- ii) Smoking

### Multiple Choice Questions

- What is the primary nutrient that provides quick useable energy for the body?  
(a) Carbohydrates (b) Proteins  
(c) Lipids (d) Nucleic acids
- The wavelike movement of muscle that pushes food through the digestive system is called;  
(a) Chemical digestion  
(b) Emulsification  
(c) Absorption  
(d) Peristalsis
- Micronutrients of plants are;  
(a) Available in the soil in small amounts  
(b) Required by plants in small amounts  
(c) Small molecules required by plants  
(d) Useful, but not required by plants
- Which of the following does not occur in the oral cavity?  
(a) Lubrication of the food  
(b) Beginning of protein digestion  
(c) Breaking the food into small fragments  
(d) All of the above do occur in the oral cavity
- Where are the villi found?  
(a) Esophagus  
(b) Stomach  
(c) Small intestine  
(d) Large intestine
- Ulcers occur in the;  
(a) Stomach (b) Duodenum  
(c) Esophagus (d) All
- Which group of enzymes breaks up starches and other carbohydrates?  
(a) Proteases (b) Lipases  
(c) Amylases (d) Duodenum
- The pancreas produces digestive enzymes and releases them into the;  
(a) Colon (b) Gallbladder  
(c) Liver (d) Duodenum
- In the stomach, pepsinogen is converted into;  
(a) Pepsin (b) Bicarbonate  
(c) HCl (d) Gastrin
- The hepatic portal vein carries blood from the \_\_\_\_\_ to the \_\_\_\_\_.  
(a) Small intestines, liver  
(b) Small intestines, heart  
(c) Liver, heart  
(d) Small intestines, colon
- Which of the following is not a function of the liver?  
(a) Converts glucose to glycogen  
(b) Converts glycogen to glucose  
(c) Detoxifies poisonous substances  
(d) Produces digestive enzymes
- The diseases of Kwashiorkor and marasmus may be due to;  
(a) Mineral deficiency  
(b) Over-intake of nutrients  
(c) Protein-energy malnutrition  
(d) Milk and cheese
- Which food group is our body's best source of energy?  
(a) Meat Group  
(b) Fats, oils and sweets  
(c) Breads and cereals  
(d) Milk and cheese



Chapter Biology 9th

14. What may be the reason that children need more calcium and iron?  
(a) Both calcium and iron for bones  
(b) Both calcium and iron for blood  
(c) Calcium for blood and iron for bones  
(d) Calcium for bones and iron for blood
15. The process of breaking down large droplets of fat into small droplets of fat is called:  
(a) Emulsification (b) Absorption  
(c) peristalsis (d) Digestion
16. Which one of the following macro nutrient is the part of chlorophyll?  
(a) Calcium (b) Magnesium  
(c) Sulphur (d) Iron
17. Which of the following is not a macronutrient?  
(a) Nitrogen (b) Oxygen  
(c) Carbon (d) Nickel
18. Chemically synthesized urea is a \_\_\_\_\_ fertilizer.  
(a) Organic (b) Inorganic  
(c) Both (d) None
19. Good calcium along with low salt and high potassium intake prevents from:  
(a) Hypertension (b) Kidney stone  
(c) a and b (d) None
20. According to (UNICEF), how many children of under age five died by malnutrition?  
(a) 4 million (b) 5 million  
(c) 6 million (d) None
21. In adult human, the esophagus is about \_\_\_\_\_ long.  
(a) 25 cm (b) 25 mm  
(c) 25 m (d) 25 ft
22. Inactive pepsinogen in gastric juice require \_\_\_\_\_ for its activated form (pepsin).  
(a)  $H_2SO_4$  (b) HCl  
(c)  $HNO_3$  (d) Saliva
23. Many bacteria in colon produce vitamin \_\_\_\_\_ necessary for coagulation of blood.  
(a) A (b) K  
(c) C (d) D
24. The secretion of liver is:  
(a) Pepsin (b) Bile  
(c) Rennin (d) Lipase
25. Breaking of large molecules of fats into small droplets is called:  
(a) Emulsification (b) Digestion  
(c) Assimilation (d) Egestion
26. Following are not fat-soluble vitamins.  
(a) A and D (b) E and K  
(c) B and C (d) D and E
27. Rickets develops due to deficiency of \_\_\_\_\_ vitamin.  
(a) B (b) A  
(c) D (d) C  
(Lahore board 2011 G I)
28. Saliva is alkaline and contains an enzyme:  
(a) Pepsin (b) Rennin  
(c) Ptyalin (d) Amylase
29. Nitrogen is present in:  
(a) Carbohydrates (b) Protein  
(c) Nucleic acid (d) Lipids
30. In which group of the following is present Mg?  
(a) Chlorophyll (b) Cytochrome  
(c) Haemoglobin  
(d) None of the above
31. which of the following is not the process included in the digestion?

- (a) conversion of amino acid into protein  
(b) Conversion of protein into amino acid  
(c) Conversion of glucose into starch  
(d) Conversion of fatty acid into lipids
- 32.** The reason why digestion take place is?  
(a) Animals need food particles in the form of smaller molecules  
(b) The large food molecule cannot pass through their membrane  
(c) The small food molecules increase their efficiency  
(d) None of the above
- 33.** The function of the mucous of the salivary gland is to:  
(a) Digest the food  
(b) Make the food chew efficient  
(c) Transport the food  
(d) Break the food
- 34.** Which of the following is not the function of saliva?  
(a) Digestion of food  
(b) Lubrication of food  
(c) Stabilization of PH  
(d) Absorption of food
- 35.** The Amylase acts on:  
(a) Protein (b) Starch  
(c) glucose (d) Lipids
- 36.** Which of the following steps does not take place during act of swallowing?  
(a) Moving of tongue up and down  
(b) Upward movement of the larynx  
(c) Opening of the glottis  
(d) the movement of epiglottis in horizontal direction
- 37.** The function of the pepsin to convert the protein into:  
(a) Amino acid (b) Peptones  
(c) Dipeptides  
(d) None of the above
- 38.** Gastrin is an:  
(a) Enzyme of gastric juice  
(b) It is a part of the stomach  
(c) It stimulate the secretion of gastric juice  
(d) It promotes the digestion of proteins
- 39.** The length of duodenum is:  
(a) 15 - 20 cm (b) 20 - 25 cm  
(c) 25 - 35 cm  
(d) None of the above
- 40.** Which of the following enzymes act on fats:  
(a) Amylase (b) Lipase  
(c) Trypsin (d) None of these
- 41.** Most of the fatty acids are absorbed by:  
(a) Epithelium of the villi  
(b) Lacteal of the villi  
(c) Blood capillaries of the villi  
(d) None of the above
- 42.** Most of the water is absorbed by:  
(a) Oral cavity (b) Stomach  
(c) Small intestine  
(d) Large intestine
- 43.** The largest gland of human body is:  
(a) Pancreas (b) Thyroid  
(c) Liver (d) Parathyroid  
(Lahore board 2011 G II)
- 44.** Bread contains amount of carbohydrates:  
(a) 40% (b) 30%  
(c) 52% (d) 70%  
(Lahore board 2011 G II)



### Answers

1. a	11. d	21. a	31. b	41. b		
2. d	12. c	22. b	32. b	42. d		
3. b	13. c	23. b	33. b	43. c		
4. b	14. d	24. b	34. d	44. c		
5. c	15. a	25. a	35. b			
6. d	16. b	26. c	36. c			
7. c	17. d	27. c	37. b			
8. d	18. b	28. d	38. c			
9. a	19. c	29. b	39. b			
10. a	20. c	30. a	40. b			

### Short Questions

**Q.1. What is amylase?**

**Ans.** Saliva contains an enzyme salivary amylase, which aids in the partial digestion of starch.

**Q.2. What is anaemia?**

**Ans.** The term anaemia literally means “a lack of blood”. The condition is caused when number of red blood cells are reduced to a level lower than the normal, caused by deficiency of iron.

**Q.3. What is appendix?**

**Ans.** From the blind end of caecum, there arises a non functional finger like projection called appendix. Inflammation of appendix due to infection causes severe pain called appendicitis.

**Q.4. What is Assimilation?**

**Ans.** Conversion and incorporation of absorbed simple food into the complex substances constituting the body is called assimilation.

**Q.5. What is a balanced diet?** (Lahore board 2011 G D)

**Ans.** A balanced diet may be defined as the one which contains the essential nutrients like carbohydrates, fats, proteins, minerals, vitamins in the correct proportion for the normal growth and development of the body.

**Q.6. What is bolus?**

**Ans.** After the processes of chewing, lubrication and partial digestion, the pieces of bread and mutton are rolled up by tongue into small, slippery, spherical mass called bolus.

**Q.7. What is cardiac sphincter?**

**Ans.** Stomach has two sphincters (openings which are guarded by muscles). The cardiac sphincter is between stomach and oesophagus. The bolus enters the stomach through it.

**Q.8. What do you know about chyme?**

**Ans.** In stomach, partially digested food is converted to a soup like mixture called chyme.

**Q.9. What do you know about colon?**

**Ans.** Large intestine has 3 parts, caecum, colon and rectum. Colon is the second part of it, from colon water is absorbed in to the blood.

**Q.10. What is constipation?**

**Ans. Constipation:** is a condition of hardening of the faeces due to excessive absorption of water through colon.

**Q.11. What is Diarrhoea?**

**Ans. Diarrhoea:** Diarrhoea is a condition when required water is not absorbed in the blood from the colon. A sufferer has frequent watery, loose bowel movements. This condition accompanied by abdominal pain, nausea and vomiting.

**Q.12. What are dietary fibres?** (Lahore board 2011 G II)

**Ans.** Dietary fiber (also known as roughage) is the part of the human food that is indigestible. It is found in plant foods and it moves undigested through the stomach and small intestine and into the colon. It is of two types: a-soluble dietary fibre b-insoluble dietary fibre.

**Q.13. Define Digestion?**

**Ans.** The conversion of large and non diffusible molecules of food into smaller and diffusible molecules, by the action of enzymes is called digestion. It is of two types: a-chemical digestion b-mechanical digestion.

**Q.14. What do you know about duodenum?**

**Ans.** Duodenum comprises of the 10 inches (25 cm) of small intestine and it is the part of the alimentary canal where most of the digestive process occurs.

**Q.15. What is emulsification?**

**Ans.** Bile, a secretion of liver has bile salts, which keeps lipid droplets separate from one another this process is called emulsification.

**Q.16. Define epiglottis and glottis?**

**Ans. Glottis:** It is the opening of the wind pipe or trachea and the **Epiglottis** is a flap of cartilage over the glottis, which close the glottis during swallowing of food through food pipe.

**Q.17. What is Famine?**

**Ans.** Famine is the lack of enough food to feed all the people living in an area. Famine may be due to unequal distribution of food, drought, flooding or increase in population.

**Q.18. What are Fat – soluble vitamins?**

**Ans.** The vitamins which are soluble in fats and are much less excreted from body are called fat soluble vitamins. e.g. Vitamins A, D, E and K are called fat – soluble vitamins.



**Q.19. What are fertilizers?**

**Ans.** During cultivation, humans have added certain materials to the soil, resulted in plants with desirable characteristics (e.g. more fruit, faster growth, better colour and more attractive flowers). Such materials are named as fertilizers. Fertilizers are classified as:

- (i) Organic Fertilizers                      (ii) Inorganic fertilizers

**Q.20. Write composition of gastric juice. Where it is secreted?**

**Ans.** When food enters stomach, the gastric glands found in the stomach wall are stimulated to secrete gastric juice. It is composed chiefly of mucous, HCl and a protein digesting enzyme pepsinogen.

**Q.21. What is gastrin?**

**Ans. Gastrin:-** When protein in stomach is digested into peptides, these peptides stimulate the some cells of stomach wall to secrete a hormone gastrin into the blood and distributed to all parts of the body including stomach. Here it has specific effects and stimulates the cells of gastric glands to secrete more gastric juice.

**Q.22. What is Goiter?**

**Ans.** Iodine deficiency in diet causes enlargement of the thyroid gland. Due to enlargement, it becomes prominent and protrudes from neck region. This disease is called goiter.

**Q.23. What is ileum?**

**Ans. Ileum:** Last 3.5 m long part of small intestine is the ileum. It is concerned with the absorption of digested food from finger like structures called villi.

**Q.24. Define inorganic fertilizers.**

**Ans. Inorganic fertilizers:** Naturally occurring inorganic fertilizers are not chemically modified includes rock phosphate, elemental sulphur and gypsum. Most inorganic fertilizers dissolve in water so they efficiently supply the required nutrient for plant growth.

**Q.25. What do you know about Intestinal juice?**

**Ans.** Intestinal juice from the intestine walls contains many enzymes for the complete digestion of all kinds of food.

**Q.26. What is Jejunum?**

**Ans.** Next to duodenum is 2.4 meters long is jejunum. It is concerned with rest of digestion of Proteins, starch and lipids.

**Q.27. What is kwashiorkor? (Lahore board 2011 G II)**

**Ans. Kwashiorkor:** It is disease caused by protein deficiency at the age of about 12 months when breast feeding is discontinued. It can also develop at any time during a child's growing years. Children may grow to normal height but are abnormally thin.

**Q.28. What is lacteal?**

**Ans. Lacteal:** A vessel of lymphatic system which is present in Ileum is called lacteal. Fatty acids and glycerol are absorbed in it. It opens in main lymphatic duct from where they enter in bloodstream.

**Q.29. What is Lipase?**

**Ans.** Lipase is an enzyme in pancreatic juice secreted by pancreas helps in the digestion of Lipids.

**Q.30. What do you know about liver? Give its two functions.**

**Ans.** A dark reddish organ, the liver is the largest gland of the body. It lies beneath the diaphragm on the right side of the abdomen. It consists of a larger right lobe and smaller left lobe. A pear shaped greenish yellow sac the gall bladder is present on its right lobe.

**Functions:**

(i) **Deamination:** Removal of amino groups from Amino acids.

(ii) **Detoxification:** Conversion of Ammonia into Urea.

**Q.31. What is malnutrition? How you can compare it from starvation?**

**Ans.** Malnutrition is a term for the condition caused by an improper or insufficient diet. Malnourished people either do not take enough calories in their diet or are eating a diet that lacks proteins, vitamins or minerals.

**Effects of malnutrition:** It weakens the immune system, impairs physical and mental health, slow thinking, and stunt growth, hinders foetal development and leads to infectious diseases.

**Q.32. What is marasmus? (Lahore board 2012 G I)**

**Ans.** In humans, protein energy malnutrition (PEM) leads to an inadequate availability of energy and protein in body which leads to diseases such as marasmus: Usually develops between the age of six months and one year in children. Patients lose all their body fat and muscle strength and acquire a skeletal appearance. Children with marasmus show poor growth and look small for their age.

**Q.33. What is mineral deficiency?**

**Ans.** Nutrient deficiency cause mineral deficiency means less availability of required minerals. The most common result of mineral deficiency is the poor growth and development in children.

**Q.34. What do you know about nutrition?**

**Ans.** The process in which food is obtained or prepared, absorbed and converted into body substances for growth and energy is called nutrition.

**Q.35. What is Oesophagus?**

**Ans.** A tube behind the pharynx is called oesophagus which connects the pharynx to the stomach. It does not contribute to digestion of food when passing through it.



**Q.36. What is oral cavity?**

**Ans.** Oral cavity is the space behind mouth, and has many important functions. Food selection is one of them. Mastication, lubrication and chemical digestion of food are other functions.

**Q.37. Define organic fertilizers.**

**Ans. Organic fertilizers:** Derived from either plants or animals' materials. Organic fertilizers are more complex chemical substances that take time to be broken down into forms usable by plants. They have fewer salts so their larger amounts can be applied without injury to plant roots.

**Q.38. What do you know about over intake of Nutrients?**

**Ans.** Over intake of nutrients (OIN) is a form of malnutrition in which more nutrients are taken than the amounts required for normal growth, developments and metabolism. Effects of over intake of nutrients are usually intensified when there is reduction in daily physical activity.

**Q.39. What is Pancreas? What is its composition?**

**Ans.** Pancreas is a leaf like organ lying below the stomach and between the two arms of the duodenum. It produces a juice called pancreatic juice.

**Q.40. What is pancreatic juice?**

**Ans.** It contains enzymes trypsin, lipase and pancreatic amylase, which digest protein, lipids and carbohydrates respectively. It is secreted by pancreas.

**Q.41. What is pepsin?**

**Ans. Pepsin:** Pepsin is an enzyme present in gastric juice, which partially digests the protein portion of the food (bulk of mutton) into polypeptide and shorter peptide chains.

**Q.42. What is Pepsinogen?**

**Ans.** A protein digesting enzyme is called pepsinogen. It is secreted by gastric glands of stomach. It is converted into Pepsin by HCl.

**Q.43. What is Peristalsis?**

**Ans.** A rhythmic contraction of alimentary canal to push food down i.e. from mouth to stomach is called Peristalsis. If due to any reason direction of peristalsis reverses, vomiting may occur.

**Q.44. Where is Pharynx located?**

**Ans.** The Pharynx is muscular passage way which extends from behind the nasal cavities to the opening of oesophagus and larynx.

**Q.45. What is Protein-energy malnutrition? (Lahore board 2011 G I)**

**Ans.** Protein-energy malnutrition refers to inadequate availability or absorption of energy and protein in the body. PEM may leads to diseases such as; kwashiorkor and marasmus.



**Q.46. What is Pyloric sphincter?**

**Ans.** The opening which is guarded by muscles is pyloric sphincter and is present between stomach and small intestine.

**Q.47. What is rectum? Give its functions.**

**Ans.** The last part of large intestine is called rectum.

**Function:** Faeces are temporarily stored in it which opens out through anus.

**Q.48. What is Saliva? Give its function?**

**Ans.** The three pairs of salivary glands (under the tongue behind the jaws and in front of ears) release a juice called saliva in oral cavity. Saliva has two functions.

- (i) It adds water and mucous to the food which acts as lubricant.
- (ii) It has an enzyme amylase, which aids in the partial digestion of starch.

**Q.49. What is Starvation?**

**Ans.** It is a severe reduction in nutrient and energy intake and is the most horrible effect of malnutrition.

**Q.50. What is stomach?**

**Ans.** The stomach is a dilated part of the alimentary canal. It is J. shaped, located in the left of the abdomen just beneath the diaphragm. It has two portions, the cardiac and the pyloric portion. Its walls have gastric glands which secrete gastric juice, which has HCl and pepsinogen, a protein digesting enzyme. In the stomach food is broken down and mixed with gastric juice by churning of it.

**Q.51. What are trace minerals?**

**Ans.** The minerals which are required by body in very small quantity less than 100 mg / day for functioning are called trace minerals i.e. Iron, Zinc, copper, chromium, fluorine and Iodine are trace minerals.

**Q.52. What are villi?**

**Ans. Villi:** In the folds of ileum, finger like structures are present, these projections are richly supplied with blood capillaries and helps in absorption of digested food. They also increase the surface area of inner walls of small intestine.

**Q.53. What are laxatives?**

**Ans.** The medicines called laxatives (e.g. paraffin) are used for the treatment of constipation.

**Q.54. What is swallowing?**

**Ans.** Pushing of bolus to the back of mouth by tongue is called swallowing.

**Q.55. What is Trypsin?**

**Ans.** Pancreas secretes pancreatic juice in which an enzyme trypsin is present which helps in the digestion of proteins.

**Q.56. What are Vitamins?**

**Ans.** Vitamins are the chemical compounds that are required in low amounts but are essential for normal growth and metabolism. These are of two types

1- water soluble vitamins      2- Fat soluble vitamins

**Q.57. What are water-soluble vitamins?**

**Ans.** Vitamins B and C are known as water- soluble vitamins. These are soluble in water, so are excreted from the body as compared to fat soluble vitamins which are much less excreted. So levels of water-soluble vitamins in the body can decrease quickly leading to vitamin deficiency.

**Q.58. Why meat is not a good source of vitamin C.?** (Lahore board 2011 G II)

**Ans.** Minute quantities of vitamin C are present in muscles. Since meat consists of muscles so it is not a good source of vitamin C.